

Customer Requirement Based on Quality Planning and Improvement for Food and Beverage Management

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Abstract

This study integrates the Kano two-dimensional quality model and quality function deployment (QFD) to construct a systematic mechanism for food and beverage service planning and improvement. This study adopts a three stage research framework: 1. Surveying food and beverage service needs, 2. Extracting key quality factors for food and beverage service, 3. Proposing methods for improving food and beverage service. Based on the results of this research, the most five important improvement action plans are personal professional skills and knowledge, increasing the visibility of restaurant advertising, providing immediate feedback to customers, standardizing quality of ingredient purchasing, and improving time efficiency of meal preparation.

Keywords

Food and Beverage Service; Kano Model; Quality Function Deployment

Introduction

Recently, many Asian countries, such as Taiwan, South Korea, Japan, Thailand, Singapore etc., have integrated traditional culture and food and beverage service into their tourism to attract more visitors. Past studies on this area have mostly focused on the nature of food and beverage offerings and interactions between customer and service personnel with a view to proposing improvements. Few studies have used customer requirements as a basis for designing, operating and improving products and services.

Identifying and understanding consumer requirements in relation to food and beverage to provide a basis for designing suitable service is important for food and beverage agents. To guarantee

service quality and identify blind spots, many restaurants have used mystery shoppers to evaluate service quality from the customer perspective and identify weak areas, including in products, facilities, environment, food and beverages. The catering trade thus urgently needs understand real customer demand, apply this knowledge in quality measurement. With regard to these needs, past studies have commented on the lack of a solution to the quality problem and have often tried to resolve the service demand gap or single service, but have not studied how closely service quality provides for customer demands.

This study uses consumer requirements to analyze food and beverage service. Consumers require tasty food, a hygienic environment, and an attractive atmosphere when dining out. This study collects customer demand and opinions and transfers them to customer demand items for restaurant service quality to identify a positive improvement scheme and new development direction for designing a creative restaurant service.

Research Framework

Collecting and understanding consumer requirements in relation to food and beverages and designing suitable services, is important for food and beverage agents. This study uses consumer requirements to analyze food and beverage service. This study integrates the Kano two-dimensional quality model and quality function deployment (QFD) to construct a systematic mechanism for food and beverage service planning and improvement. This study adopts a three

stage research framework (FIG. 1).

Stage 1: Suverying food and baverage service needs

The concept of two-dimensional quality, as early as from Frederick Herzberg (1959) was proposed. The MH theory of motivation (Motivator-hygiene theory) earlier is to use in employee incentives, known as the Motivator - Hygiene Theory or two-factor theory of job attitudes. Kano et al. (1984) proposed a model that was inspired from Herzberg's motivator-hygiene model and identified the quality attributes into five categories: they are attractive, must-be, one dimensional, indifferent, and reverse quality attributes. Kano et al. (1984) represented these quality attributes as illustrated in FIG. 2.

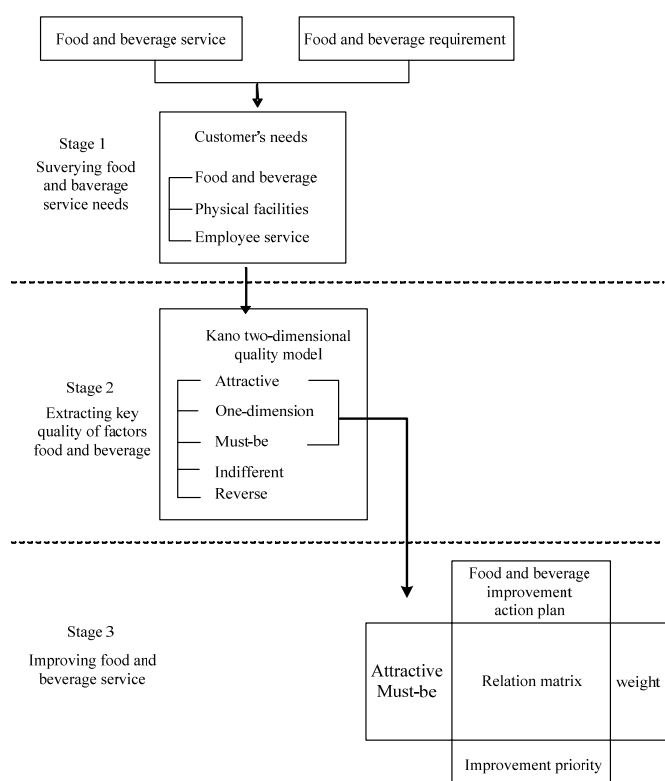


FIG. 1 RESEARCH FRAMEWORK

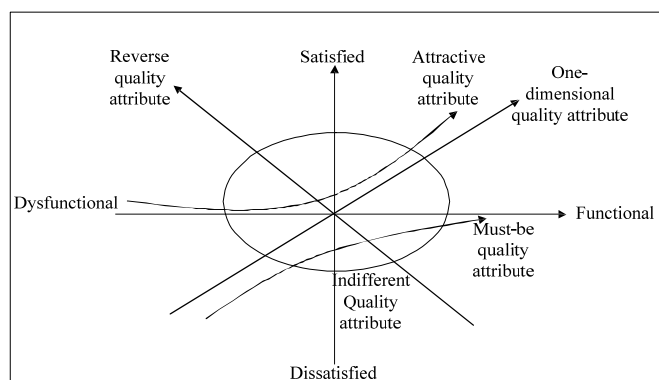


FIG. 2 THE KANO MODEL

1. The must-be quality: Here, customers become

dissatisfied when the performance of this product attribute is low or absent. However, customer satisfaction does not rise above the neutral level with increased performance of this product attribute.

2. The one-dimensional quality: Here, customer satisfaction is a linear function of product attribute performance (quality). Increasing attribute performance leads to enhanced customer satisfaction.
3. The attractive quality: Here, customer satisfaction increases super linearly with increasing attribute performance. There is not, however, a corresponding decrease in customer satisfaction with a decrease in criterion performance.
4. Indifferent Quality: The quality of the elements, whether fulfillment or not, the customer have no special feeling or reaction. That is, the customer will not satisfy whether the customers have this quality element or not.
5. Reverse Quality: This kind of the quality element will result in customer dissatisfaction. Most customers do not like this quality factor. Kano called this quality factor as "reverse quality" or "one dollar quality".

The application of Kano model includes: customer requirement evaluation, product design and manufacturing and the service quality study and improvement (tourism, hospital, restaurant and retail) (Sauerwein et al., 1996; Matzler & Hinterhuber, 1998; Von Dran et al., 1999; Shahin, 2004; Tontini, 2007).

Stages 2: Extracting key quality factors for food and beverage service

Based on investigations of consumer requirements, the Kano two-dimensional quality model summarized demand analysis using five key aspects of service quality that should be a focus in continuing to improve quality. According to the survey results, two types of key quality factors, namely, attractive and must-be qualities, could be extracted using the Kano model.

Stages 3: Improving food and beverage service

To extract attractive and Must-be qualities, QFD is used to transform key quality factors into improvement action plans. These action plans might enable food and beverage service entrepreneurs to develop suitable food and beverage services that meet

the requirements of different groups to enhance consumer satisfaction and increase their competitiveness.

QFD is a customer-driven product development tool, considered as a structured management approach for efficiently translating customer needs into design requirements and parts deployment, as well as manufacturing plans and controls in order to achieve higher customer satisfaction. Quality function deployment systematically improved the quality of functional parts and components and translated customer expectations, in terms of specific requirements, into directions and actions. Through these efforts, an organization that correctly implemented QFD could improve engineering knowledge, productivity, and quality and reduce costs, product development time, and engineering changes (Besterfield et al. 2003, Yang & Fang 2003, Raharjo et al. 2008). The QFD has been well applied in many fields. QFD has been adopted to develop products and services (Hsu et al. 1997, Leary & Burvill 2007), and to facilitate the planning, assessment and upgrading of managerial systems (Yang et al. 2006, Büyükoçkan et al. 2007).

Surveying Food and Beverage Service Needs

This study improves customer satisfaction with restaurant service by assessing customer requirements and proposes relevant schemes for improving service. The questionnaire design uses customer requirements and appraisals of restaurant food and beverage service to understand consumer expectations of service quality, and their reasons for repeat consumption. The questionnaire design, incorporating 22 items related to restaurant service quality, focuses on three main aspects of restaurants, namely food and beverage, physical and service attributes, collected from the literature on restaurant service quality (Jones 1983, Stevens et al. 1995).

1. food and beverage: The food and beverage index includes freshness, moderate degree, diverse selection of dishes and beverages, good taste and attractive decor. This index rates restaurants in terms of seven aspects.

- (1) Freshness of ingredients.
- (2) Certifications of origin of ingredients used.
- (3) Regular menu changes.
- (4) Regular changes to the set menu.

- (5) A menu with light dishes.
- (6) Consistent taste.
- (7) Clear pricing displayed on the menu.

2. facility: The facility index includes a clean dining area, offering a comfortable and attractive environment. This index includes six measures.

- (1) Restaurant and signage aesthetics.
- (2) The relevant parking information.
- (3) Décor.
- (4) Seating arrangement.
- (5) Restaurant seating space.
- (6) Restaurant layout

3. staff service attributes: Staff service includes aspects of timeliness, professional knowledge, and basic courtesy. The staff service index includes nine aspects.

- (1) Attentiveness of servers.
- (2) Server explanation of discounts and promotions while taking an order.
- (3) Server explanation of meal content. Timeliness of service.
- (4) Ability of staff to adjust meal contents to match customer needs.
- (5) Activity scheduled at a restaurant.
- (6) Customer motivation in dining at the restaurant.
- (7) Customer habits in seeking restaurant information.
- (8) Influences of recommendations and media on customer visit behaviour.

Extracting Key Quality Factors of Food and Beverage Service

Based on the customer requirements and expectations of service quality, FIG. 3 shows the procedure of two-dimensional quality questionnaire designed and used in this study.

TABLE 1 KANO'S QUERY ITEM QUESTIONNAIRE

10. Table service, including timeliness, made you feel:
☐ 1Very unsatisfied ☐ 2 Unsatisfied ☐ 3. No opinion ☐ 4 Satisfied ☐ 5. Very satisfied
The lack of exclusive servers for each table made you feel:]
☐ 1Very unsatisfied ☐ 2 Unsatisfied ☐ 3. No opinion ☐ 4 Satisfied ☐ 5. Very satisfied
How do you rate the importance of the key element of this quality
☐ 1Not very important ☐ 2. Not important ☐ 3. Ordinary
☐ 4. Important ☐ 5. Very important

The Kano questionnaire is designed based on the two-dimensional concept. Regarding attributes of service quality, positive and negative query items are necessary. The designed questionnaires comprise two major parts. Part one comprises 22 questions regarding attributes of restaurant service quality. Part two comprises personal information on interviewees. Three blocks must be filled for each item. The first block comprises an evaluation of feelings, and is sufficient for the relevant attributes. The second is evaluation of feelings and is insufficient for the concerned attributes. Both blocks mainly carry out positive and negative items designed by Kano in this research questionnaire. Questionnaires in which respondents indicates their responses using five grades (very unsatisfied, unsatisfied, no opinion, satisfied, and very satisfied) were used to investigate customer satisfaction with service quality. TABLE 1 shows the Kano's questionnaire used in this study.

To make customers look over it food and beverage service demand and rate it based on their real world

experiences of a dinner, formal questionnaires are administered after consumers finish their meals. The target release is for 500 questionnaires. In satisfaction grade analysis, this study classifies quality key element using the classification method of Matzler & Hinterhuber (1998), as shown in TABLE 2. This method is adopted because the literature is used at most, making it easy for the interviewer to easily understand the answer state.

TABLE 2 TWO-DIMENSIONAL QUALITY MODEL CLASSIFICATION

insufficient sufficient	joyful	certain	unfeeling	endurant	displeasure
joyful	Unable to determine	Attractive quality	Attractive quality	Attractive quality	One-dimensional quality
certain	Reverse quality	Indifferent quality	Indifferent quality	Indifferent quality	Must-be quality
Unfeeling	Reverse quality	Indifferent quality	Indifferent quality	Indifferent quality	Must-be quality
Endurant	Reverse quality	Indifferent quality	Indifferent quality	Indifferent quality	Must-be quality
displeasure	Reverse quality	Reverse quality	Reverse quality	Reverse quality	Unable to determine

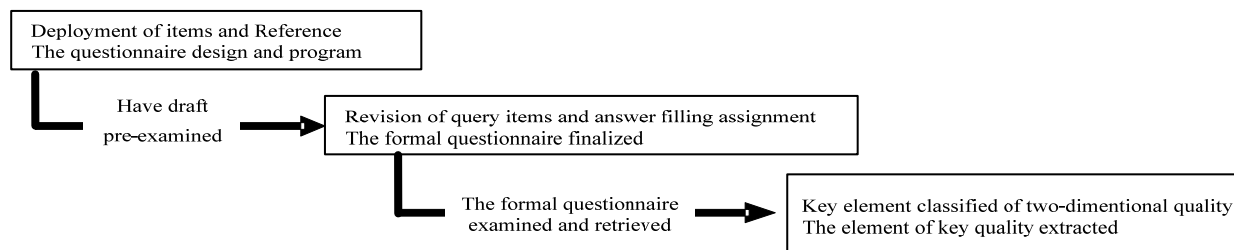


FIG. 3 THE TWO-DIMENSIONAL QUALITY QUESTIONNAIRE PROCEDURE

TABLE 3 TWO-DIMENSIONAL QUALITY OF FOOD AND BEVERAGE SERVICE CLASSIFICATION

Reference	Service quality element items	A	O	M	R	I	U	Classification
Food and beverage	Freshness of ingredients	47.6%	0%	1%	0%	44%	7.4%	A/I
	Certification of origin of ingredients used	52.6%	3.8%	7.2%	1.2%	35.2%	0%	A
	Regular menu changes	52.8%	16.8%	10.6%	0%	19%	0.8%	A
	Regular changes to the set menu	24.2%	2%	35.8%	0%	32.6%	5.4%	M/I
	A menu with light dishes	45.6%	1%	0%	5.4%	46.6%	1.4%	I/A
	Consistent taste	16.4%	15.4%	49.6%	0%	18.4%	0.2%	M
	Clear pricing displayed on the menu	29.2%	12.2%	11%	0.2%	43.8%	3.6%	I
facility	Restaurant and signage aesthetics	47.2%	7.4%	11.6%	0.2%	33.6%	0%	A
	The relevant parking information	6.8%	55.2%	18.6%	0%	19.4%	0%	O
	Décor	53.8%	0.6%	7.6%	0	38%	0%	A
	Seating arrangement	26.4%	6%	5.8%	11.8%	48%	2%	I
	Restaurant seating space	27%	0.4%	17.2%	0.8%	54.2%	0.4%	I
	Restaurant layout	19.2%	22.2%	9.4%	0%	48.8%	0.4%	I
staff service attributes	Attentiveness of servers	34.8%	1%	15.8%	9.6%	30%	8.8%	A
	Server explanation of discounts and promotions while taking an order	32.4%	0%	40.6%	5.4%	18%	3.6%	M
	Server explanation of meal content	35.6%	3%	10.2%	0.6%	48.4%	2.2%	I
	Timeliness of service	56.6%	0.6%	2.2%	0%	39.4%	1.2%	A
	Ability of staff to adjust meal contents to match customer needs	26.2%	27.4%	3.8%	9.4%	32.2%	1%	I
	Activity scheduled at a restaurant	42.4%	0.8%	0.4%	17.6%	36.2%	2.6%	A
	Customer motivation in dining at the restaurant	41%	1%	0.2%	6%	51.2%	0.6%	I
	Customer habits in seeking restaurant information	23.2%	7.8%	14.2%	11.8%	39.8%	3.2%	I
	Influences of recommendations and media on customer visit behavior	49.8%	0.6%	1.6%	6.2%	36.8%	5%	A

Through the questionnaire investigation of the Kano two-dimensional quality, this study classifies consumer demands regarding restaurant service as Attractive, One-dimensional, Must-be, Indifferent and Unattractive, including 22 quality element items, then analyzes Must-be and Attractive qualities to provide a direction for food and beverage management in relation to service improvement and planning to promote competition and satisfy customer categories of two-dimensional quality and the analytical results listed in TABLE 3:

This questionnaire is analyzed as follows: one of which is compound quality. Three items are classified as must-be quality key elements, one of which is compound quality. No items are classified as reverse quality key elements. One item is classified as a one-dimensional quality key element. Finally, 11 items are classified as indifferent qualities, three of which are compound. Attractive qualities include: fresh material, certification of origin for ingredients, changing restaurant menu, restaurant and signage aesthetics, restaurant décor, exclusive servers providing table service, restaurant attendants can perform the service timing procedure of the dining table suitably, scheduling of activities at the restaurant, influence of recommendations and media articles on diner visit behavior; Must-be quality: rotation of set menu, consistency of flavor, restaurant attendants, server explanation of discounts and promotions during the customer order process. Attractive quality and Must-be quality key element, provide improved or kept, maintain the direction and further suggest relevant future actions.

Improvement of Food and Beverage Service

Required Improvements in Food and Beverage Service

To improve the service content and market competitiveness of food and beverage offerings, this study appraises and implements a questionnaire investigation of customer psychology in relation to food and beverage service demands. The investigation and analysis include nine attractive quality key elements of service attributes and three Must-be quality key elements. These attractive and must-be quality key elements are used in this study to construct the foundation for improving the proposed action scheme to improve food and beverage service quality. TABLE 4 lists the Attractive and Must-be quality elements and their importance weights.

TABLE 4: ATTRACTIVE QUALITY KEY ELEMENT AND MUST-BE QUALITY KEY ELEMENT

Reference	Service quality element items	Weight
food and beverage	Freshness of ingredients	4.33
	Certification of origin of ingredients used	3.95
	Regular menu changes	3.63
	Regular changes to the set menu	3.38
	Consistent taste	4.21
facility	Restaurant and signage aesthetics	3.52
	Décor	3.54
staff service attributes	Attentiveness of servers	3.64
	Server explanation of discounts and promotions while taking an order	3.52
	Timeliness of service	4.34
	Activity scheduled at a restaurant	2.42
	Influences of recommendations and media on customer visit behavior	3.30

TABLE 5: ACTION SCHEME FOR IMPROVING FOOD AND BEVERAGE SERVICE QUALITY

Aspect	Action scheme
Purchasing and storage	Standardization of ingredient quality and purchasing
	Standardization of ingredient storage temperature
	Eat the preliminary preparation standardization of ingredient
Products	Ingredient standardization
	Putting meal decoration esthetic
	Time efficiency of meal preparation
Environment apparatus	Planning of kitchen assembly line
	Uniqueness of tableware
	Sound control in dining area
	Smell and ventilation in the dining area
	Bright and highly-visible signage
Personnel training	Outstanding décor and furnishings
	Courtesy
	Professional skills and knowledge
Marketing	Standardization of dining table service procedures
	Provision of immediate feedback on customer schemes
	Provision of long-term feedback on customer schemes
	Improving the visibility of restaurant advertising
	Participating in various food and beverage contests

Action Plan for Improving Food and Beverage Service Quality

Facing the above needs for improvements in service quality, this study utilizes quality function deployment technology for demand analysis, and establishes an effective scheme for achieving quality improvements. Meanwhile, this study examines actual executive programs to clarify the priority of implementing improvements to every improvement scheme. This research develops improvement action plans according to the result of Kano two-dimensional quality key element and food and beverage service attributes. The planned scheme for achieving improvements in food and beverage service quality comprises five aspects: purchase and storage, products, environmental apparatus, training,

marketing. The five references provide a foundation for developing each improvement scheme, TABLE 5 lists every service reference and action scheme project, where the contents of each reference description are as follows:

1. Purchase and storage: Emphasizing the purchase of ingredients and the storage of ingredients and semi-manufactured meals. Action plans include standardization of the quality of purchased ingredients, standardization of temperature for ingredient storage spaces, standardization of prepared ingredients, etc.
2. Products: Aspects of presenting the meal on the dining table, mainly including: material consumption standard, plating and presentation, time efficiency, etc.
3. Environmental apparatus: restaurant internal and external environment and all associated apparatus, including planning of kitchen assembly lines, uniqueness and integrality of tableware, sound control in dining areas, bright signage, outstanding decor and furnishings, etc.
4. Staff training: training of restaurant staff in professional skills and customer service, including courtesy, professional knowledge, skill, and standardization of table service.
5. Marketing: Understanding customers, and ensuring products or services accord with customer demand, including providing immediate feedback on customer schemes, providing long term feedback on customer schemes, improving the visibility of restaurant advertising, etc.

Degree of correlation matrix: ◎: Strong correlation ○: Median correlation △: Low correlation		Purchasing and storage		Products		Environment apparatus				Personnel training		Marketing				Weight					
		Standardization of ingredient quality and purchasing	Standardization of ingredient storage temperature	Eat the preliminary preparation standardization of ingredient	Ingredient standardization	Putting meal decoration esthetic	Time efficiency of meal preparation	Planning of kitchen assembly line	Uniqueness of tableware	Sound control in dining area	Smell and ventilation in the dining area	Bright and highly-visible signage	Outstanding décor and furnishings	Courtesy	Professional skills and knowledge		Standardization of dining table service procedures	Provision of immediate feedback on customer schemes	Provision of long-term feedback on customer schemes	Improving the visibility of restaurant advertising	Participating in various food and beverage contests
Food and beverage	Freshness of ingredients	◎	◎	○			△	○		△				◎			○	○			4.33
	Certification of origin of ingredients used	◎	△	○										○				○	○		3.95
	Regular menu changes	◎	◎	◎	◎	○	◎	◎	△					◎	△	◎	◎			○	3.63
	Regular changes to the set menu	◎	◎	◎	○	◎	◎	△	◎					◎			◎	◎	○	△	3.38
	Consistent taste	◎	○	◎	◎		◎	◎	△					◎					◎	○	4.21
facility	Restaurant and signage aesthetics										◎	○	○						◎	△	3.52
	Décor					○			◎	◎	◎	○	◎	○					◎	○	3.54
staff service attributes	Attentiveness of servers		○	○	○		○	○						△	◎	◎	◎	◎	○		3.64
	Server explanation of discounts and promotions while taking an order													◎	◎	◎	◎	○		○	3.52
	Timeliness of service			○	○		◎	◎		○				◎	◎	◎					4.34
	Activity scheduled at a restaurant	△	○	○	○		○	△		◎	◎	◎	◎	○	◎	○	◎	◎	◎	◎	2.42
	Influences of recommendations and media on customer visit behavior	△			◎	◎	△	△	◎	○	○	◎	◎			△	○		◎	◎	3.30
	Absolute weight	181	137	157	142	93	166	143	100	77	68	94	94	89	277	118	184	153	186	103	

FIG. 4 IMPROVEMENT ACTION PLAN DEPLOYMENT

Action Plan Deployment

FIG. 4 shows the deployment of the improvement action plan. The left input side shows service demand items requiring improvement, and the improvement action plan is detailed above. The relationship matrix in the middle of FIG. 4 represents the relationship between items requiring improvement and the responsibilities of individual departments. In the quality house, three symbols represent the interrelationship between elements of the relationship matrix demand and action plan. Symbol © indicates a strong interrelationship, with a score of 9; Symbol ○ indicates an indirect interrelationship, with a score of 3; Symbol △ suggests a coordinative process, with a score of 1. A blank space suggests no interrelationship, and thus is scored 0. Figure 4 shows the deployment of quality house in action planning schemes. In action planning schemes, the scores of the interrelationship elements among action program planning are multiplied by the accumulated weight to obtain the weighting. The weights of various items are calculated

based on the service quality requirement items multiplied by the weight value of the planning items of the service quality requirement to derive the correct value via accumulation. FIG. 4 shows the results of the absolute weight calculation recorded in the quality house.

Discussion

Based on the results of deploying the action scheme for improving food and beverage management, the five most important action plans are those relating to professional skills and knowledge, increasing the visibility of restaurant advertising, providing immediate feedback to customers, standardizing quality of ingredient purchasing, and improving time efficiency of meal preparation. This study collects relevant interactions among the important degrees of the improvement action plan, improvement action scheme, and restaurant staff and customers, and transfers these interactions to food and beverage service system design, as shown in FIG. 5.

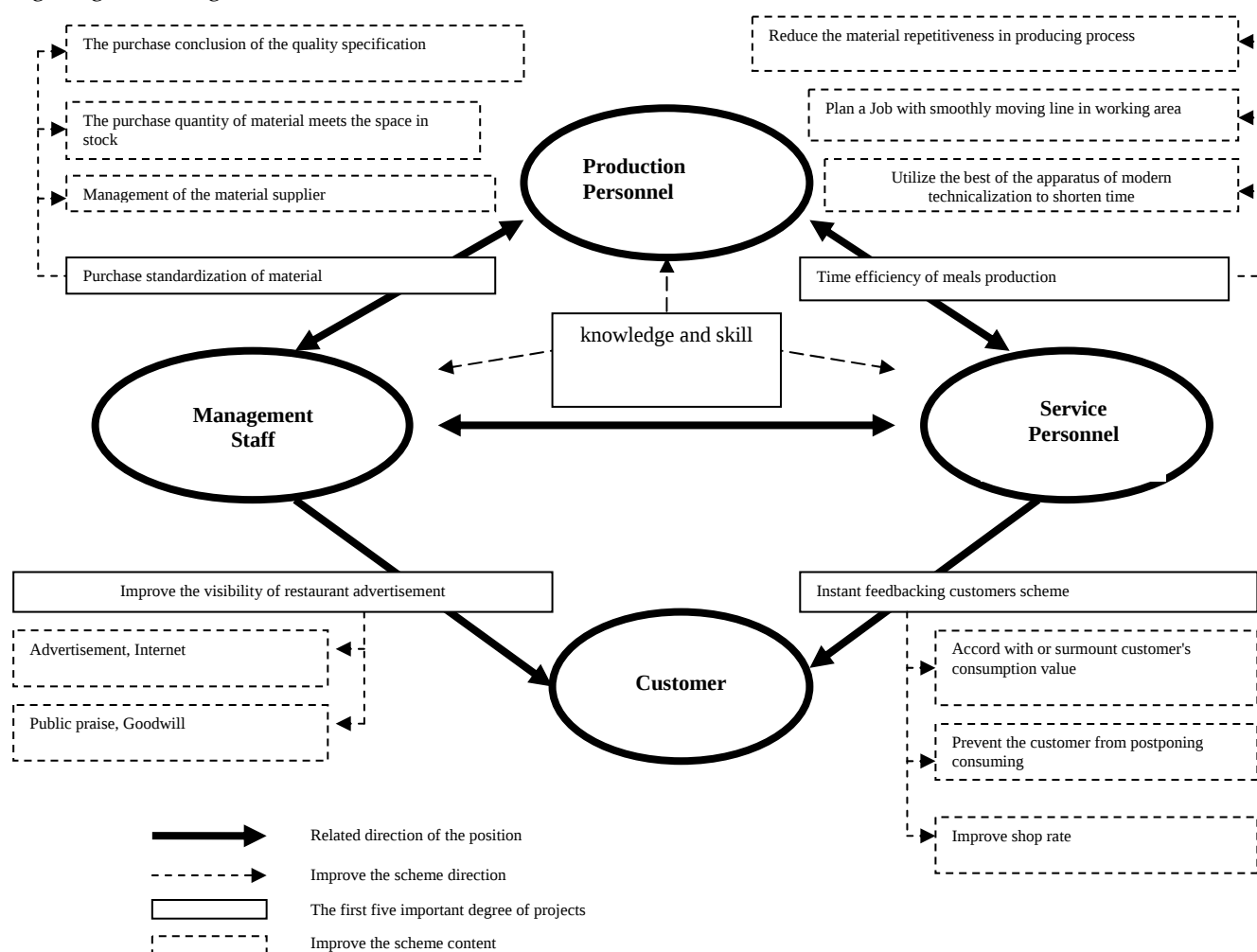


FIG. 5 THE DESIGN OF FOOD AND BEVERAGE SERVICE SYSTEM

1. Personnel professional skills and knowledge: staff maintain a clean and tidy appearance, are energetic and respectful, speak politely, are able to observe and predict customer demand, are familiar with the menu, and can deal with kitchen personnel to communicate customer requests. Regarding Production Personnel training: areas of focus include hygiene, correct ingredient storage, responsible and stable product technology level, and preparation before meal production.
2. Increase the visibility of restaurant advertising: The strategy of administrators in marketing promotion is to increase the popularity of the restaurant with regional customers. The strategy includes marketing to develop potential consumers, developing customers in geographically dispersed areas via the Internet, communicating unique restaurant characteristics to consumers via Facebook or the Internet, and establishing goodwill.
3. Providing customers with immediate feedback: includes feedback by total money with consumption, seasonal entertainment, and other customer attractions.
4. Standardized purchasing to ensure ingredient quality: Besides purchasing and maintaining a sufficient volume of ingredients, the conclusion of specifications and quality must agree with required production. Volume control, expiry, utilization and surplus with a sequence should be effectively commanded in stock, and should pay constant attention to supplier food stock reports. To avoid inappropriate supplier behaving damaging goodwill.
5. Timeliness of meal production: high meal production efficiency can increase customer satisfaction, table turnover, and revenue. Preparation before opening thus is necessary to control and minimize materials and tools handling. Additionally, line in working area to reduce meal delay during production procedure, and exploiting modern technological apparatus can effectively shorten meal production time.

Conclusions

To offer consumers food and beverage service with value, restaurant proprietors must effectively handle consumer expectations and demands regarding

restaurant service quality. This study adopts the two-dimensional quality questionnaire to help restaurant proprietors improve their capability to handle restaurant service design for food and beverage service. This study obtains the results of investigation and analysis. The focus in improving service quality is on one attractive quality item, and three must-be quality items related to food and beverage, physical attributes, and staff service attributes. Facing improvement requirements, this study applies quality function development (QFD) technology to transfer an influence of impressing not only on restaurant service, but also on operating profits continuously even more from the first five very important degree of projects of improvement action scheme, including knowledge and skill, improving the visibility of restaurant advertising, providing instant feedback on customer schemes, standardization of purchases to ensure ingredient quality, and ensuring time efficient meal production. Therefore, restaurant proprietors must assess operational results based on the execution of the degree of importance of projects from five aspects, while leading in diversity of restaurant service design, and must continue to improve service quality and hence competitiveness.

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